

1. Broad Market Potential

- o Broad set(s) of applications
- o Multiple vendors, multiple users
- o Balance cost, LAN vs. attached stations

The fast growth of CPU speed is forcing the development of new LANs with higher bandwidth.

The following applications and environments will benefit from this capability:

- o Backbone, Server and Gateway connectivity
- o Higher Bandwidth for multimedia, distributed processing, imaging, medical, CAD/CAM, and pre-press applications
- o Aggregation of 100Mb/s switches
- o Upgrade for large installed base of 10/100 Ethernet

Multiple vendors and users have demonstrated interest by attending the Gigabit Ethernet tutorial (over 200 participants), attending the preliminary study group meeting (over 120), and enrolling in the higher speed E-Mail reflector (over 210).

81 participants representing at least 54 companies indicate that they plan to participate in the standardization of 1,000 Mb/s 802.3.

This level of commitment indicates that a standard will be supported by a large group of vendors. This in turn will ensure that there will be a wide variety of equipment to support a multitude of applications.

Higher-speed 802.3 solutions, which include scaled up versions of existing 802.3 topologies, have balanced cost. Prior experience with scaling 802.3 across the range of 1 to 100 Mb/s indicates that the cost balance between adapters, cabling, and hubs, remains roughly constant, provided that the operating speed can be achieved within the limits of current technology.

2. Compatibility with IEEE Standard 802.3

- o Conformance with CSMA/CD MAC, PLS
- o Conformance with 802.2
- o Conformance with 802 FR

The proposed standard will conform to the CSMA/CD MAC, with currently authorized extensions, appropriately adapted for 1000 Mb/s operation.

In a fashion similar to the 100BASE-T standard, the current physical layers will be replaced with new Physical Layers (PHY) as appropriate for 1,000 Mb/s operation.

The proposed standard will conform to the 802.2 LLC interface.

The proposed standard will conform with the 802 Functional Requirements Document (with the possible exception of Hamming distance).

The CSMA/CD access method will not support a 2 km network diameter at this speed while maintaining the current values in the MAC parameter table. This portion of the application space will be addressed at 1,000 Mb/s with the full duplex operating mode of 802.3.

3. Distinct Identity

- o Substantially different from other 802.3 specs/solutions
- o Unique solution for problem (not two alternatives/problem)
- o Easy for document reader to select relevant spec

The proposed standard is an upgrade for 802.3 users, based on the 802.3 CSMA/CD MAC, running at 1,000 Mb/s.

Maximum compatibility with the installed base of over 60 million CSMA/CD nodes is maintained by adapting the existing CSMA/CD MAC protocol for use at 1,000 Mb/s.

Established benefits of CSMA/CD and the 802.3 MAC include:

- o Optimistic transmit access method
- o High efficiency in full-duplex operating mode
- o Well-characterized and understood operating behavior
- o Broad base of expertise in suppliers and customers
- o Straightforward bridging between networks at different data rates

The Management Information Base (MIB) for 1,000 Mb/s 802.3 will maintain consistency with the 802.3 MIB for 10/100 Mb/s operation. Therefore, network managers, installers, and administrators will see a consistent management model across all operating speeds.

The proposed standard will encompass one Physical Layer solution for each specific type of network media (e.g. single mode fiber, multi-mode fiber, coaxial cable, balanced pair cable).

The proposed standard will be a supplement to the existing 802.3 standard, formatted as a collection of new clauses, making it easy for the reader to select the relevant specification.

4. Technical Feasibility

- o Demonstrated feasibility; reports - - working models
- o Proven technology, reasonable testing
- o Confidence in reliability

Technical presentations, given to 802.3, have demonstrated the feasibility of using the CSMA/CD MAC in useful network topologies at a rate of 1,000 Mb/s.

Technical presentations given to 802.3 from multiple current vendors of Full Speed Fibre Channel components have demonstrated the feasibility of physical layer signaling at a rate of 1.06 GBaud on both fiber optic and copper media.

Many of these vendors have expressed support for an increase in the signaling rate to 1.25 GBaud, which would support a MAC data rate of 1,000 Mb/s.

The principle of scaling the CSMA/CD MAC to higher speeds has been well established by previous work within 802.3. The 1,000 Mb/s work will build on this experience.

The principle of building bridging equipment which performs rate adaptation between 802.3 networks operating at different speeds has been amply demonstrated by the broad set of product offerings that bridge between 10 and 100 Mb/s.

Vendors of full speed Fibre Channel components and systems are building reliable products which operate at 1.06 GBaud, and which meet worldwide regulatory and operational requirements.

5. Economic Feasibility

- o Cost factors known, reliable data
- o Reasonable cost for performance expected
- o Total Installation costs considered

Cost factors are derived from the current Full Speed Fibre Channel component supplier base.

A reasonable cost increase (3X of 100BASE-FX) with a ten-fold increase in available bandwidth in the full duplex operating mode will result in an improvement in the cost/performance ratio by a factor of 3.33 for multi-mode fiber applications.

The provision for a half duplex operating mode using the 802.3 CSMA/CD MAC will permit the construction of very inexpensive repeating hubs.

Customers will in many cases be able to re-use their existing fiber that has been installed in accordance with ISO/IEC 11801. Installation costs for new fiber runs based on established standards are well known and reasonable.

Costs for coaxial based short run copper links are well established for full speed Fibre Channel.

While the cost model for the horizontal copper cabling is well established, the cost model for 1000 Mb/s physical layers which will operate on horizontal copper cabling has not yet been firmly established. Presentations have been given to the HSSG which suggest a cost multiple of 2X relative to 100BASE-T2.